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NATURE-STUDY AND MANUAL TRAINING.

Every child should have an intelligent acquaintance with our common woods, that he may recognize them in the interior furnishings of any building and in ordinary articles of furniture; nor should the simple reasons for their beautiful markings be a mystery to him. The manual-training room is one place where much of this information may be quietly and naturally imparted, and as quietly and naturally assimilated, without any forcing of the subject on the part of the teacher.

When the children of the third grade were asked to name all the trees they could remember, the result was sixteen varieties, and they were much surprised when told that in the United States alone five hundred kinds were native. The question easily followed: "How many of these do we use in the manual-training room?" and it was found that from eight to ten different woods were commonly in use there. Immediately came the suggestion: "Let's get a collection of all the kinds of wood we can." There are few children who are not interested in making collections, the choice of the objects depending upon age, season, or environment; and this proposal met with general favor. The same day a party, armed with saws, set out to sample all the varieties growing within the radius of a block. Perhaps the locust tree furnished the most food for reflection that day. Although a small tree, the boy who had selected it as the one he would sample decided to climb it in order to saw off a piece. A speedy discovery of its strong thorns followed, and brought a group of interested observers to advise and warn him. After an expedition lasting three quarters of an hour, the return was made with specimens of oak, elm, cottonwood, willow, pine, locust, maple, and cherry. At the suggestion of one child, a leaf of each tree had been gathered together with the specimen of wood. In the schoolroom each piece of wood was examined, and its color, texture, and the character of its bark were remarked. Each sample of wood and leaf was properly labeled by the child who had brought it, and the collection of woods was begun. Since then the children have brought in samples of wood found near their homes, and in time the seed of these different trees is to be added.

A trip was made to the Field Columbian Museum to see the collection of woods there and the manner in which each piece is cut in order to show the bark, the annual rings, the grain, the medullary rays, and the difference between heartwood and sapwood. The age of a tree nearly a century old was determined by a count of its annual rings, and that of a giant bamboo by a count of its nodes.

In Sweden the lumber for manual-training work is frequently procured by chopping down a tree in the immediate vicinity of the school. It is split, seasoned, and, as necessity demands, worked down to planks of the desired proportions. If we were able to command such an object-lesson, the knowledge of the tree in its environment, with its various characteristics and peculiarities, its likes and dislikes, its neighborliness to some things and its unneighborliness to others, all its attributes which make it seem almost human, might unconsciously become a part of the child's equipment. To some children a plank seems but a plank, nothing more, nothing less; proving much the same quality of ignorance as is cited in that old story of the child who learned to her great surprise that cows gave milk — she "had always supposed the milkman brought it."

In the first grade the Christmas presents were generally made from holly, walnut, or bird's-eye maple. It was interesting to note the various remarks as different woods were selected. One chose holly and thought she "would use red ribbons, the color of the berries." Another had walnut, and as the pungent odor came to him of the freshly sawed wood, he exclaimed delightedly: "It smells just like the walnuts!" Another said he "liked the maple wood because sugar came from that tree, but did not care for the little spots in the wood," meaning the curious twist in the fibers, which gives to it the name of bird's-eye maple. We talked of the relative features of the three trees: the short holly tree, with its gray bark and beautiful dark-green, glistening leaves, with the bright red berries showing here and there; the large walnut tree, with its great crown of leaves and branches, its black bark, and brown rough walnuts; and the maple with its bark and beautiful crown of leaves, in size neither so large as the walnut tree nor so small as the holly. Colored crayons and paints were used, and pictures were made of any tree that had particularly interested the children; and later they made pictures of the three trees, showing their relative sizes. The holly was a great favorite, perhaps because one of the rooms in the building had just been decorated with holly, and the memory was fresh; or perhaps because of the brightness of the red berries and green leaves. While the pictures were crude, they showed the feeling the six-year-old child had concerning the tree, its size, and its offerings of berries and fruits. In one of the illustrations the small artist explained "that the maple tree did not have nuts on it, but some leaves were darker than others."

At the time the large pine-wood sandboxes were being made by the children of the third grade, they complained of the number of knots and knot-holes in the wood; whereupon one little boy made haste to explain that these were caused by branches on the tree, some of which had been trimmed off when the tree was chopped, and some of which died and dropped off or were blown off, as the tree struggled among others for room and light.

Working "with the grain" is another fertile text for a lesson in nature-study, capable of various applications. Even the smallest pupil understands when told that the tree grows upward, composed of many small thread-like fibers, held closely together within the snugly fitting bark; and that when these fibers are rubbed backward, or "against the way they grew," the result will be a roughening of the surface, and that the solution of the difficulty is to plane or stroke in the other direction, "the way it grew." During one of the recent class conversations on the subject of the grain of the wood, a fifth-grade boy announced "that he was glad to know at last what was meant by the expression 'a cross-grained man'." The smallest child is pleased when his attention is called to the fact that the fiber growth is in one direction, as is the cat's fur, which is roughened or smoothed by rubbing it the wrong way or the right way. Sometimes the mistake is made of sandpapering the completed article across, instead of with, the grain. When the scratches appear, the reason is readily understood if some small boy's head is stroked from the crown toward the forehead, smoothing the hair; or across the head, from one ear toward the other, roughening it. One boy told the class with surprised pleasure that he discovered that plaining around a knot in the wood was like smoothing the hair around the crown; "smoothing just one way wouldn't do."

The pupils very soon become critical and fastidious judges, and able to select a beautiful piece of wood, suitable for the end in view.

The older grades may receive more detailed instruction. Passing from the simple lessons given the younger children, with reference to fibers, annual rings, medullary rays, and the practical and poetic significance of heartwood and sapwood, to the more scientific lessons pertaining to botany. The tree may be treated as a plant, a member of a large community of trees, with habits and mannerisms influenced by the circumstances of country, soil, and climate.

By following a tree from the logging-camp to the schoolroom, valuable lessons may be gained in botany, geography, the laws of mechanics, and political economy. The contribution a tree makes toward the necessaries of life is a lesson — its use for building purposes, for fuel, paper pulp, textiles, gunpowder, various chemicals, tan bark, turpentine, resin, nuts, and even sugar. A tree is also of interest as the home of myriads of living creatures.

Indeed, all handwork, which of necessity employs materials gathered from the earth's resources, is but an exponent of nature-study. The fundamental law of nature — creating, and creating with some definite purpose — is most clearly demonstrated in the manual-training room.

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